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Emotion classification of Western contemporary Music: Identifying a representative feature set

Background Emotion classification algorithms rely on an extraction process to create numerical representations of raw music information. The result is a feature vector which is used to characterise the audio signal within a specific context or application. Frequency domain analysis is the primary method of creating these features which range from low-level acoustical parameters to high-level structural representations. Previous studies in music emotion classification have concentrated on feature sets for classical, film and folk music with little attention being given to western contemporary music. This may be due to the constraints of the composition and production techniques associated with this type of content which create difficulties in extracting meaningful features. Despite these issues the ubiquity of this genre shows a clear need for work in this area. Furthermore, if any emotion classification system is to have ‘real-world’ value it must have the ability to deal with this type of popular content.

Aims This paper describes the creation of a feature set which can be used to identify the expressed emotional qualities of western contemporary music. By combining low-level acoustical features with high level structural aspects such as melodic complexity an optimum feature set was created which characterizes contemporary music in an emotion classification context.

Method A corpus of novel music tracks was assessed by participants using a time-continuous emotion measurement methodology. Based on the 2-dimensional circumplex model this approach provided participant responses based on factors of arousal and valence. The stimuli were selected by a panel

of expert listeners to represent a popular music style.

Signal analysis techniques were used to extract an initial vector of 586 features: acoustical and psychoacoustical features were extracted using signal analysis techniques, and a symbolic MIDI representation for structural characteristics. Through a series of statistical analyses a subset of features was selected which are most highly correlated with participant responses.

Results The corpus showed strong correlation with a number acoustical and structural features. Timbral features correlated highly with overall measures of both valence and arousal. Tonal measures also showed a strong relationship with arousal.

Conclusions This study provides evidence of a relationship between a subset of musical features and expressed emotion in Western contemporary music. In particular it highlights the need to combine acoustical, psychoacoustical and structural to establish an optimum feature set.

Topic Areas Music and emotions

Key Words Contemporary music, music emotion classification, music information retrieval.